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SOME SUGGESTIONS FOR TEACHING MYCOLOGY

By
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The study of any group of plants as to its taxonomy may proceed along two widely divergent lines: First, the student may be taught to use artificial keys and determine species, which are put in their respective species pigeon-holes and properly labeled, the prime object being to determine the binomial, but little concern being given to the relationship of the various forms studied; or Second, the student may be taught to construct diagrammatic keys to the various groups, which will express natural relationship. These natural keys, which give a graphic representation of relationship, are clearer than the obscurely worded artificial keys crowded full of technical terms. The writer has followed the latter method with marked success in presenting the taxonomy of seed plants with successive classes through a period of years and more recently has used the same plan with classes in mycology. The method has a number of features to recommend it, some of which are: (1) The creation of a greater interest on the part of the student in his work; (2) The development of the students' ability to reason and weigh evidences; (3) The cultivation of the scientific imagination; (4) A better understanding of evolution and what it means; and (5) The possibility of emphasizing natural descent of the various groups and bringing out the fact that classification is in reality but a means to an end,—an expression of relationships.

The work in mycology in our laboratory is offered to students who have had general elementary botany and also to those who have had in addition a semester in general pathology, in both of which they gain some familiarity with fungi. The minimum time which suffices for anything like a satisfactory presentation of the subject is six hours of laboratory work throughout the year. The general method of procedure may be briefly presented.

Very early in the beginning of the work the class is given a skeleton outline of the great groups, somewhat as shown in the accompanying diagram (Fig. 1), except that the diagrams are omitted and the student is required to select diagrams and make any adjustments that may seem necessary to present concepts of the great groups by the visual channel, or to bring out more clearly the natural relationships. Various mycological works, such as Engler & Prantl, Rabenhorst's *Kryptogamen Flora*, special monographs, etc. must be available for reference. Suggestions are

given to the student, but they are encouraged to use their own originality and independent thought as well as to consult authorities. They are also

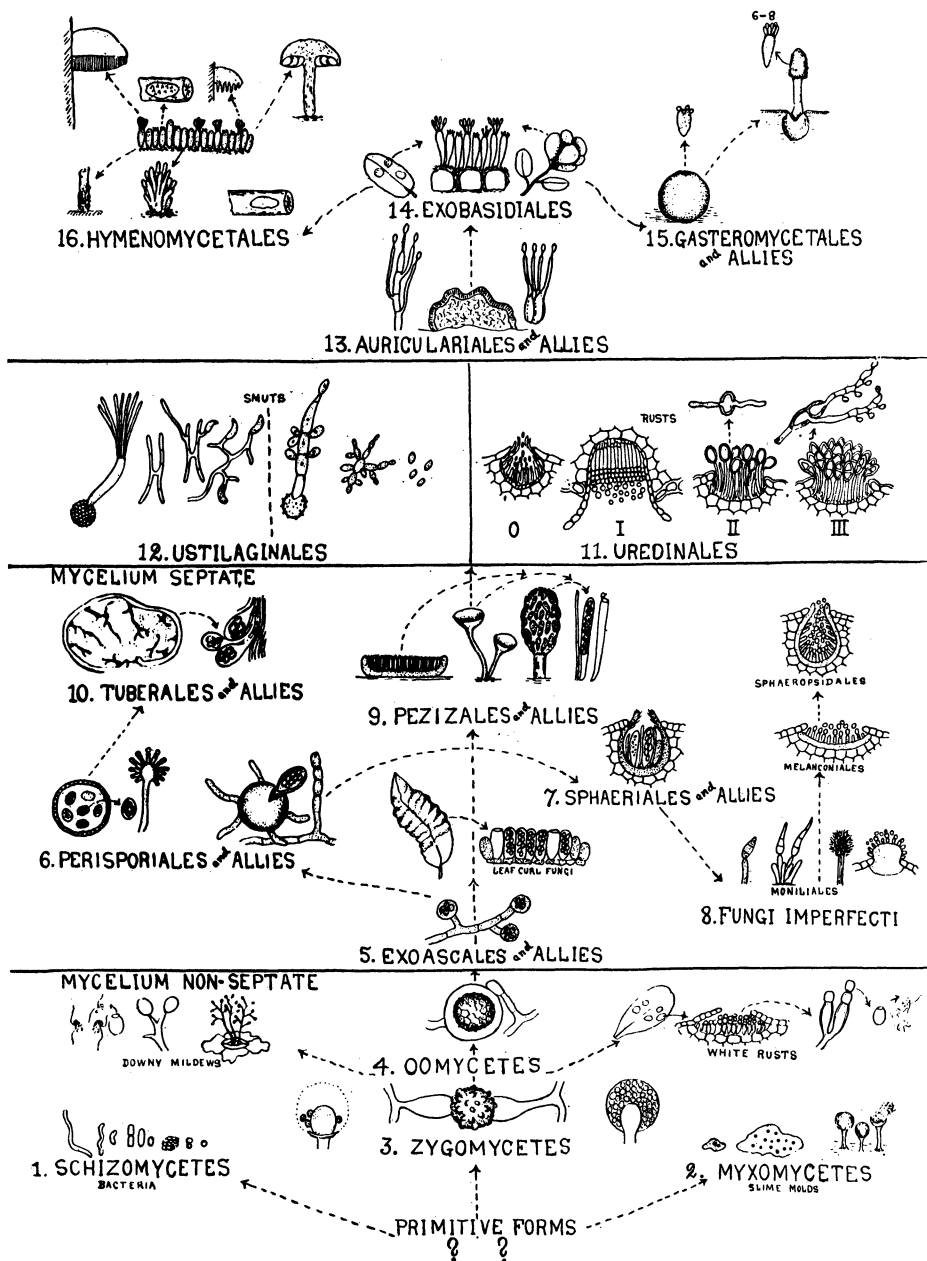


FIG. 1. Chart Showing the Great Group of Fungi.

given the understanding that schemes of natural relationship can be nothing more than the expression of individual opinion, which should be arrived at by weighing all the evidence that can be brought to bear in any specific case. No two students will choose the same illustrations and the more intimate details of relationship as expressed in the charts are certain to show variations. These variations afford excellent material for class discussions which can frequently be held with much profit.

The logical order for the study of the great groups would be to begin at the bottom of the family tree with the most primitive forms and proceed to the more complex and higher forms later. In actual practice, however, it seems better to sacrifice logic and begin with some group which more readily lends itself to the method in question. The Erysiphaceae, or powdery mildews of the order Perisporiales, is a family well suited to introduce the plan of study: (1) Because species determination is relatively easy; (2) Because representatives of all the genera can very readily be obtained in most environments. Our plan would call for a careful and detailed study of some type of each genus, accompanied by drawings. Following this the student is asked to construct a diagrammatic key to the genera of powdery mildews, which will express relationship and afford generic concepts, mainly through the visual channel. Before this key is made, a general class discussion is held and the more important characters which may indicate relationship are briefly reviewed, with emphasis on those which are primitive and those which are more advanced. These keys are then presented for comparison and discussion (Fig. 2). After the completion of the keys, the class is asked to determine the species of all the powdery mildews which they have collected on some of their special field trips.

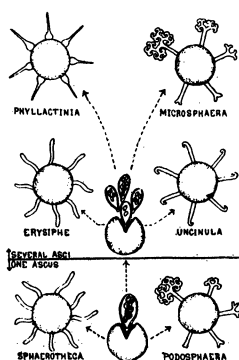


FIG. 2. Chart Showing the Genera of Powdery Mildews

Essentially the same plan is followed with all the great groups or alliances, or with representative families of these groups. It will be at once evident that all groups can not be treated as fully as the Erysipha-

ceae, which we have used for our introduction to the method. For example, in the study of the Sphaeropsidales of the Imperfect Fungi, attention is given to the genera furnishing parasites and only these are included in the graphic key which the students are required to construct. In other cases, as in the Sphaeriales and allies with numerous families, the graphic keys may be limited to a representation of the families.

As previously stated, the minimum time for a course in mycology according to the plan outlined is six hours of laboratory work per week throughout one school year. With this minimum time there must of necessity be many omissions and consequently much of the success of the course depends on the judgment of the instructor in making wise selections. There is no doubt that the same plan could be followed with much profit throughout an additional year of work.

This brief note has been prepared at the suggestion of several of my former students who have been stimulated to further mycological study by the use of the method outlined. It is hoped that it may offer some suggestions to some of our younger mycologists who have received their instruction by the pigeon-hole method.

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